

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF NEBRASKA**

UNITED STATES OF AMERICA,

Plaintiff,

8:19CR299

vs.

TRENTON D. WASHINGTON,

Defendant.

MEMORANDUM AND ORDER

This matter is before the Court on the Motion to Exclude DNA Evidence, ECF No. 35, filed by Defendant Trenton D. Washington. The parties appeared for oral argument on Defendant's Motion on June 12, 2020. For the reasons stated below, the Motion will be denied.

BACKGROUND

While investigating a bank robbery that occurred on September 19, 2017, at a Bank of the West in Omaha, Nebraska, law enforcement collected swabs for DNA testing from several items. The swabs were taken from the handlebars and seat of a bicycle, a bicycle helmet, and handles on a bag. Law enforcement sent the swabs for testing to the Federal Bureau of Investigation Laboratory Division (the "FBI Laboratory") in Quantico, Virginia. To test the swabs, the FBI Laboratory used a probabilistic genotyping software program called STRmix. Probabilistic genotyping software assists analysts in calculating a statistic called a "likelihood ratio" (LR). The LR helps analysts determine the probability that any one specific person contributed to a DNA sample. See ECF No. 44-9 at 2, Page ID 160. STRmix is one of several types of probabilistic genotyping software.

Based on the STRmix analysis, the FBI Laboratory determined the DNA from the handlebars was a mixture from three contributors. The report states that the DNA of the primary contributor matched Washington's DNA, and constituted 93% of the DNA from the swab. ECF No. 44-1 at 1, Page ID 86; ECF No. 44-2 at 1, Page ID 93. The STRmix results indicated "very strong support" for Washington's inclusion as one of the contributors to the DNA found on the handlebars. ECF No. 44-3 at 1, Page ID 109. The report listed an LR of 2.9×10^{27} , meaning the DNA mixture on the swab from the handlebars is "2.9 octillion times more likely if Washington and two unknown, unrelated people are contributors than if three unknown, unrelated people are contributors." *Id.*

The DNA taken from the bike seat was a mixture from two contributors. The report stated that the DNA of the primary contributor matched Washington's DNA, and constituted 65% of the DNA from this swab. ECF No. 44-4 at 1, Page ID 112. The STRmix results indicated "limited support" for Washington's inclusion as one of the contributors. ECF No. 44-2 at 2, Page ID 94. The report indicated an LR of 11, meaning the DNA mixture on the swab is "11 times more likely if Washington and an unknown, unrelated person are contributors than if two unknown, unrelated people are contributors." *Id.*

The DNA found on the helmet was a mixture from four contributors. The report stated that the DNA of a secondary contributor matched Washington's DNA, and constituted 28% of the DNA from the swab. ECF No. 44-7 at 1, Page ID 141; ECF No. 44-8 at 1, Page ID 152. The STRmix results indicated "strong support" for Washington's inclusion as one of the contributors. ECF No. 44-3 at 2, Page ID 110. The report listed an LR of 90,000, meaning the DNA mixture on the swab is "90,000 times more likely if

Washington and three unknown, unrelated people are contributors than if four unknown, unrelated people are contributors.” *Id.*

Finally, the DNA found on the handle of the bag was a mixture from four contributors. The report shows that the DNA of a secondary contributor matched Washington’s DNA, and constituted 26% of the DNA from the swab. ECF No. 44-5 at 1, Page ID 121; ECF No. 44-6 at 1, Page ID 133. The STRmix results indicated “very strong support” for Washington’s inclusion as one of the contributors. ECF No. 44-3 at 2, Page ID 110. The report listed an LR of 8.3×10^6 , meaning the DNA mixture on the swab is “8.3 million times more likely if Washington and three unknown, unrelated people are contributors than if four unknown, unrelated people are contributors.” *Id.*

Washington argues that the STRmix statistics are unreliable. His motion also raises issues regarding the chain of custody of the DNA samples.

DISCUSSION

I. Reliability of STRmix Statistics

Washington first argues that the LR created by the STRmix is unreliable under Federal Rule of Evidence 702. Rule 702 states:

A witness who is qualified as an expert by knowledge, skill, experience, training, or education may testify in the form of an opinion or otherwise if:

- (a) the expert's scientific, technical, or other specialized knowledge will help the trier of fact to understand the evidence or to determine a fact in issue;
- (b) the testimony is based on sufficient facts or data;
- (c) the testimony is the product of reliable principles and methods; and
- (d) the expert has reliably applied the principles and methods to the facts of the case.

Under *Daubert v. Merrell Dow Pharmas., Inc.*, 509 U.S. 579 (1993), and *Kumho Tire Co. v. Carmichael*, 526 U.S. 137 (1999), the Court must screen proffered expert testimony for relevance and reliability. See *Bland v. Verizon Wireless*, (VAW) L.L.C., 538 F.3d 893, 896 (8th Cir. 2008). A reliable opinion must be based on scientific methodology rather than on subjective belief or unsupported speculation. See *Turner v. Iowa Fire Equip. Co.*, 229 F.3d 1202, 1208 (8th Cir. 2000). In assessing reliability, the Court should consider whether the proposed expert's theory, methodology or technique: 1) can be and has been tested; 2) has been subjected to peer review; 3) has a known or potential rate of error; and 4) is generally accepted by the relevant community. *Bland*, 538 F.3d at 896. This list of factors is not exclusive, and this Court is allowed "great flexibility" in its analysis. *Jaurequi v. Carter Mfg. Co.*, 173 F.3d 1076, 1082 (8th Cir. 1999). Authority and evidence demonstrate that STRmix is generally accepted by the relevant community. Authority and evidence also demonstrate that STRmix has been tested and subjected to peer review.

A. Testing and Peer Review

Washington argues generally that STRmix relies on subjective information and results can vary to an impermissible degree depending on the lab and the analyst involved. Yet courts have recognized that STRmix software has been thoroughly tested and reviewed. See *United States v. Pettway*, No. 12-CR-103S, 2016 WL 6134493, at *2 (W.D.N.Y. 2016) ("The software and its underlying principles have been peer-reviewed in more than 90 articles."). Washington does not offer any evidence¹ that STRmix and the

¹ Washington's only evidence that STRmix data is inherently unreliable is a news article from the National Institute of Standards and Technology (NIST) titled *NIST Experts Urge Caution in Use of Courtroom Evidence Presentation Method*. ECF No. 39-2. The article does not suggest that STRmix and the LR are inherently unreliable, but argues that they should be used only in cases where a "probability-based model is warranted." *Id.* at 2, Page ID 66. For the reasons stated below, questions about whether this is an appropriate case for STRmix data go to weight rather than admissibility.

LR are inherently unreliable. He relies primarily on a 2016 report by the President's Council and Advisors on Science and Technology ("PCAST") that addressed the validity and reliability of probabilistic genotyping software programs such as STRmix (the "PCAST Report").² The PCAST Report examined the published evidence and concluded:

The two most widely used methods (STRmix and TrueAllele) appear to be reliable within a certain range, based upon the available evidence and the inherent difficulty of the problem. Specifically, these methods appear to be reliable for three-person mixtures in which the minor contributor constitutes at least 20 percent of the intact DNA in the mixture and in which the DNA amount exceeds the minimum level required for the method.

PCAST Report at 80; see also *United States v. Lewis*, No. CR 18-194, 2020 WL 1027151, at *3 (D. Minn. Mar. 3, 2020). An addendum to the PCAST report clarified that the concerns related to the minor contributor arise when the person of interest contributes less than 20% of the DNA in the mixture. PCAST Addendum, ECF No. 44-12 at 8, Page ID 207; see also *Lewis*, 2020 WL 1027151, at *3. The PCAST Report further stated that “[t]he range in which foundational validity has been established is likely to grow as adequate evidence for more complex mixtures is obtained and published.” PCAST Report at 82.

Washington argues that the PCAST Report casts doubt on the reliability of STRmix where there are more than three contributors to a DNA sample. The Government has presented evidence and authority showing that, in response to the PCAST Report, studies have been published in peer-reviewed scientific journals. See Moretti, T.R., et. al., *Internal validation of STRmix for the interpretation of single source and mixed DNA profiles*.

² The parties did not submit a copy of the PCAST Report. Washington provided the following link: https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/PCAST/pcast_forensic_science_report_final.pdf

Forensic Science International: Genetics, 29:126-144 (2017), ECF No. 44-10. In the Moretti study, the authors concluded that STRmix “is fit for the interpretation and statistical assessment of … mixtures originating from two, three, four and five individuals.” *Id.* at 18, ECF No. 44-10, Page ID 188.

The court in *Lewis* described a study conducted and published by STRmix co-developer Dr. Buckleton and his colleagues at New Zealand’s Institute of Environmental Science and Research (ESR). 2020 WL 1027151, at *18. The study, titled Internal Validation of STRmix—a Multi-Laboratory Response to PCAST (the “PCAST Response Study”), examined DNA mixtures compiled from 31 laboratories. *Id.* Researchers targeted samples with mixtures of three, four, five, and six contributors. *Id.* The study found that “when the mixtures were compared with the DNA profiles of thousands of known contributors and millions of non-contributors, STRmix was able to distinguish the contributors from non-contributor[s] with a high level of accuracy.” *Id.* The study “show[ed] persuasively that STRmix is capable of producing accurate results with extremely low error rates: STRmix not only works, it seems to work extremely well, at least when used in the manner it was used in these studies.” *Id.* The court in *Lewis* adopted the PCAST Response Study and concluded that it addressed the concerns raised in the PCAST Report.³ *Id.* at *17-18.

These studies, including the PCAST itself, suggest that questions about STRmix’s reliability arise only when samples contain several different contributors and only a low-

³ Although not raised in Washington’s briefing, the Court is aware of the potential argument that the PCAST Response Study was not sufficiently independent. The Court in *Lewis* addressed this argument and concluded that although each of the submitting labs in the study had a stake in the outcome, the “STRmix Internal Validation Study [was] sufficiently independent to satisfy PCAST’s recommendation.” *Id.*

level contribution from the minor contributor. See e.g., PCAST Report at 80 (“these methods appear to be reliable for three-person mixtures in which the minor contributor constitutes at least 20 percent of the intact DNA in the mixture”). Recent studies demonstrate that STRmix has become increasingly reliable, even with DNA samples with more than three contributors.⁴ Washington has not refuted these studies or offered further explanation for why STRmix is inherently unreliable. Moreover, even if there are questions about the reliability of testimony based on STRmix statistics, such questions “generally go to the weight of the witness’s testimony, not its admissibility.” *Robinson v. GEICO Gen. Ins. Co.*, 447 F.3d 1096, 1100 (8th Cir.2006) (citation omitted). Weaknesses in STRmix’s reliability may be addressed through vigorous cross-examination. See *Daubert*, 509 U.S. at 596. The evidence refutes Washington’s argument that STRmix is inherently unreliable and—for purposes of the Court’s gatekeeping role under *Daubert*—the Government has shown that STRmix methodology has been tested and peer reviewed.

B. Generally Accepted by the Relevant Community

The Government has shown that testimony based on STRmix data has been accepted by the relevant community. Courts have recognized that STRmix is used in several federal laboratories, in more than forty states, and in at least thirteen other countries. See *United States v. Tucker*, No. 18 CR 0119, 2020 WL 93951, at *4 (E.D.N.Y. Jan. 8, 2020). “Courts have overwhelmingly admitted expert testimony based on STRmix

⁴ Washington also argued at the hearing that the Government failed to show that the version of STRmix software used to test the samples was not the version of the software that has been peer-reviewed and tested. Courts have rejected this argument where updates “did not materially alter the STRmix software’s accuracy, the PCAST Response Study’s validation testing on the later version was sufficient to establish the foundational validity and reliability of” the later version. *Lewis*, 2020 WL 1027151, at *4. Questions about whether the updated versions of software materially altered the reliability go to weight of the evidence and not admissibility. See *id.*

results." *Id.*; see also *Lewis*, 2020 WL 1027151, at *18-21; *United States v. Christensen*, No. 17-CR-20037-JES-JEH, 2019 WL 651500 (C.D. Ill. Feb. 15, 2019); *United States v. Oldman*, Case No. 18-CR-0020-SWS, Docket No. 227, slip op. (D. Wyo. Dec. 31, 2018); *United States v. Russell*, No. CR-14-2563 MCA, 2018 WL 7286831 (D.N.M. Jan. 10, 2018); *United States v. Pettway*, No. 12-CR-103S, 2016 WL 6134493 (W.D.N.Y. Oct. 21, 2016). Testimony based on STRmix statistics have also been admitted in the District Court of Douglas County, Nebraska. See *State v. Inda*, CR 18-3547 (Dec. 27, 2019). These cases demonstrate that STRmix has been accepted by the relevant community.

Only one federal court has ruled that STRmix did not meet *Daubert* standards. In *United States v. Gissantaner*, 417 F. Supp. 3d 857 (W.D. Mich. 2019), the DNA mixture at issue was composed of three contributors, with only a seven percent contribution associated with the defendant. *Id.* at 877. The court concluded that such a low percentage from a minor contributor pushed the "outer bounds" of validation. *Id.* In contrast to the samples in *Gissantaner*, the samples at issue in this case contain a much higher percentage contribution associated with Washington's DNA. Washington's DNA corresponds with 93% of the DNA on the swab from handlebars of the bicycle, 65% of the DNA on the swab from seat of the bicycle, 26% of the DNA on the swabs from the handles of the bag, and 28% of the DNA on the swab from helmet. These percentages are all well above the 20% threshold at which the PCAST Report raised concern. As noted above, any questions regarding STRmix's reliability in this case go to the weight that should be given to STRmix statistics, not their admissibility.

II. Chain of Custody

Washington's motion also raises concerns regarding the chain of custody of the DNA samples. To the extent Washington argues that the evidence should be suppressed based on a constitutional violation, these arguments should have been raised in a motion to suppress rather than a motion to exclude evidence. The deadline for such motions has passed. See ECF No. 34. Moreover, “[a] defect in the chain of custody ‘typically affects the weight of the evidence rather than its admissibility.’” *United States v. Manning*, 738 F.3d 937, 944 (8th Cir. 2014) (quoting *United States v. Brumfield*, 686 F.3d 960, 965 (8th Cir. 2012)). At the hearing, the Government acknowledged that it will be its burden at trial to show it properly handled DNA evidence. Accordingly, any defects in the chain of custody may be addressed through cross examination at trial.

CONCLUSION

The evidence demonstrates that STRmix has been tested and subjected to peer review, is widely accepted by the relevant community, and has been examined and admitted in other courts of competent jurisdiction. Accordingly, the evidence meets the *Daubert* threshold for admissibility. Any concerns about STRmix’s reliability or the chain of custody of DNA evidence may be addressed through cross-examination.

Accordingly,

IT IS ORDERED: The Motion to Exclude DNA Evidence, ECF No. 35, filed by Defendant Trenton D. Washington, is denied.

Dated this 16th day of June 2020.

BY THE COURT:

s/Laurie Smith Camp
Senior United States District Judge